



Stormwater Management Practice Note NSC 07: Detention Tanks

This practice note has been developed to give general information on the minimum design requirements and maintenance of detention tanks for both residential and non-residential applications for on-site stormwater management in order to comply with District Plan Rule 8.4.8. It is applicable to all areas of the city except the Long Bay Structure Plan Area.

7.1 Introduction

Detention tanks are tanks which temporarily store rain water from your roof and other hard surfaces and release it at a slower rate so that the peak flows are no more than they were before the development took place. These tanks are applicable in an urban environment where there is a lack of capacity in the downstream stormwater system, where flooding of other properties is a problem, and where extended high flows are unlikely to increase stream erosion.



Figure 7.1 : Detention Tank

7.2 Description

Detention tanks work by temporarily storing the rainwater runoff during a rainfall event and then slowly releasing the water through a controlled small diameter orifice into the public stormwater system. This storage and slow release of the rainwater reduces the peak stormwater flows during a rainfall event and hence reduces the impacts on downstream infrastructure and/or streams.

RAINWATER COLLECTED FROM ROOF OR PAVED AREAS

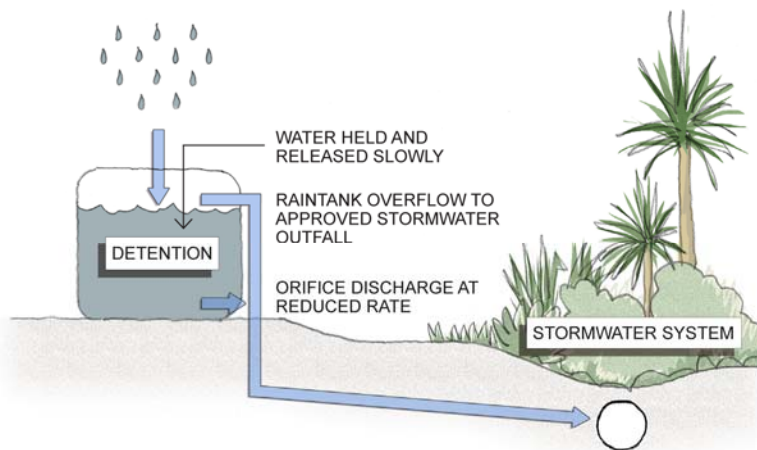


Figure 7.2 : Schematic layout of a detention tank

The tank size can vary anywhere from 1m^3 upwards depending on the required stormwater controls. They can be above or below ground. Run-off from roof surfaces and paved areas can both be collected by the tank.

7.3 When should detention tanks be used?

Detention tanks may be used as one of the on-site stormwater mitigation methods used to meet the permitted activity requirements of District Plan Rule 8.4.8 in Stormwater Management Area 4.

7.4 Advantages of detention tanks

Detention tanks provide the following benefits:

- They capture the first flush of runoff and thereby improve water quality
- They reduce peak flows from rainfall events up to a 10 year event
- They can be used for managing peak flows from both roof areas and paved areas

7.5 Minimum Design Requirements

1. **Tank volume** : The tank size will depend on the area that requires mitigation and the proportion of the impervious area that is able to be drained via the tank. To manage peak flows from a 10% (10 Yr) and 50% (2 yr) AEP rainfall events you require approximately 3m^3 of storage for every 100m^2 of catchment area. The required size can be read off using the solid line on Figure 7.3 below.

It is possible for a tank to provide mitigation for some area (up to 25%) that does not drain to it. This is called offset mitigation. In this case the tank needs to be slightly larger and the orifice slightly smaller to compensate for the area not draining to the tank. You

can read off the required size using the dashed line on Figure 7.3. In this situation the Contributing Impermeable Area refers to the total area that is being mitigated.

Note that the design volume refers to the useable storage volume between the centre of the outlet orifice and the overflow level and that a minimum tank size has been set at 1m^3 .

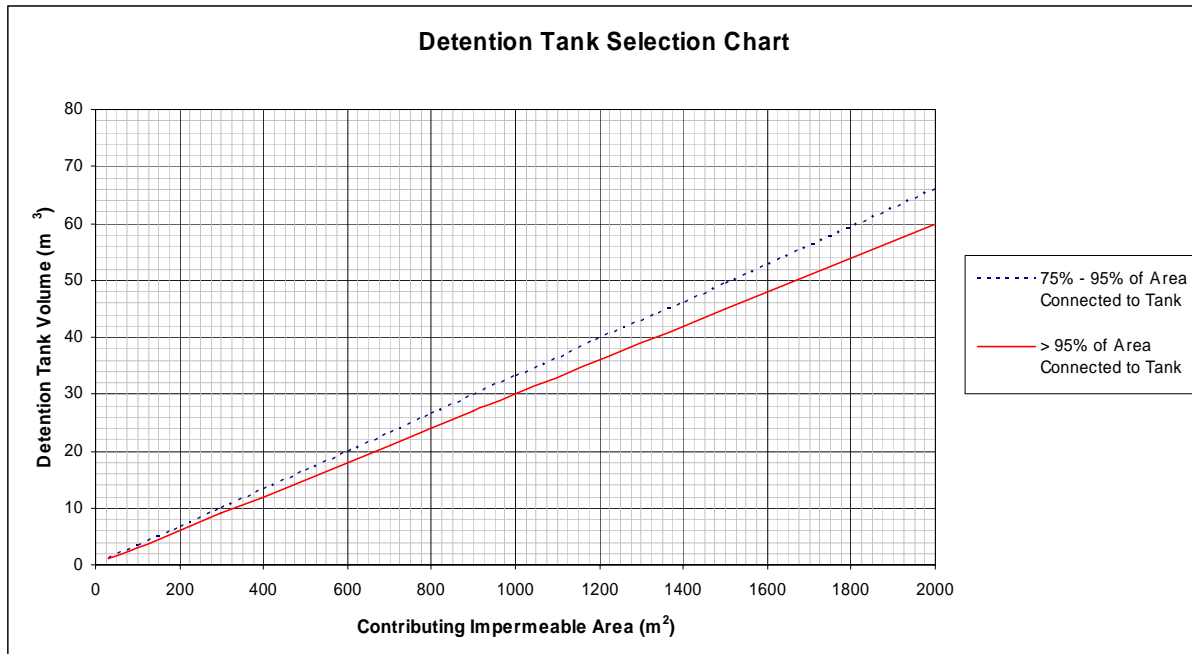


Figure 7.3 : Detention Tank Selection Chart

2. **Overflow** : An overflow must be provided which drains to an approved stormwater outfall. The overflow must be sized so that it is at least the same size as the inlet to the tank.
3. **Access** : Access must be provided for maintenance. Especially the orifice which must be accessible when the tank is full.
4. Inlets from paved areas require catchpit inserts as sediment traps.
5. Tanks may be above or below ground but must be clearly identifiable for maintenance and inspection purposes. Below ground tanks must be located so as not to adversely affect building foundations.
6. **Position of the orifice** : A dead storage volume is required at bottom of the tank for sediment build up – the orifice is to be located at least 100mm above the base of the tank and must be located so that it can easily be accessed for inspection and maintenance.
7. **Size of the orifice for 2 & 10 yr** : The size of the orifice is dependant on the type of detention to be provided as well as the volume and depth of the tank. Figures 7.5 and 7.6 below can be used as a first approximation to size the orifice. For maintenance reasons, the minimum size of the orifice should be 10mm in diameter. *For more detail refer to the NSCC Rain Tank Guidelines.*

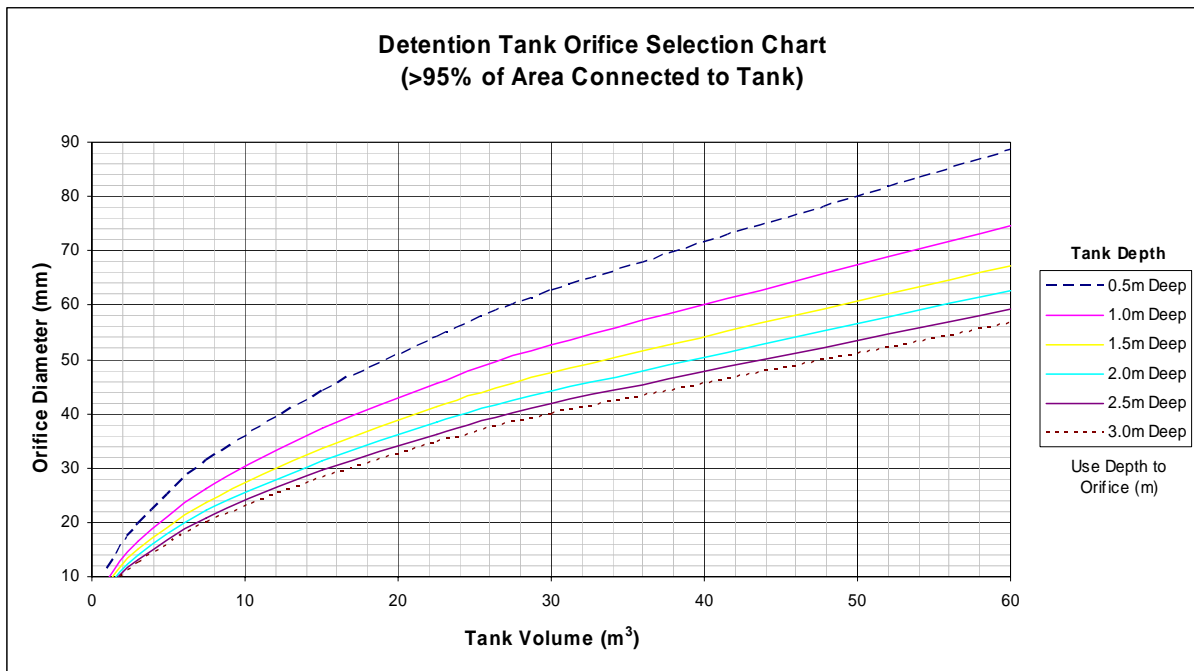


Figure 7.5: Orifice Sizing Chart for 2yr & 10yr Detention

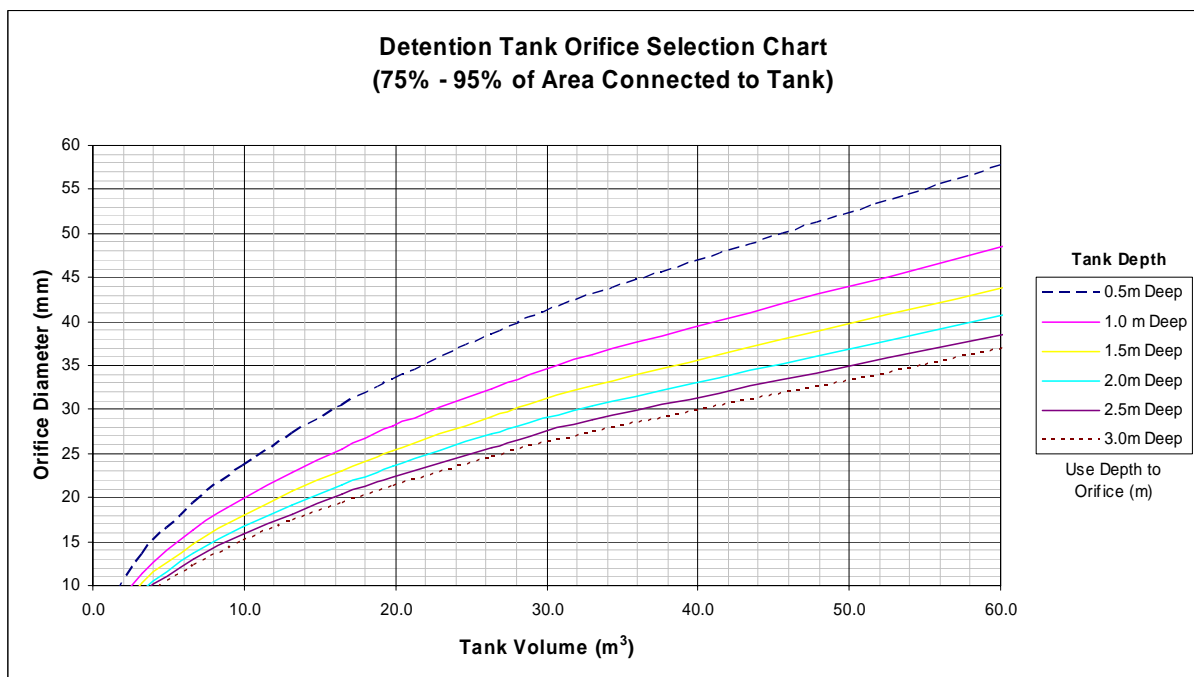


Figure 7.6: Orifice Sizing Chart for 2yr & 10yr Detention

7.5 Maintenance

Rainwater tanks need to be maintained regularly to ensure that the system is operating as it is intended and that water quality is satisfactory. Two copies of an Operation and Maintenance Manual must be provided, one copy to be held on site and the other copy to be kept on the Council property file. (*Refer the NSCC Rain Tank Guidelines for full details on maintenance*).

In summary maintenance requirements are:

| Maintenance Action | Frequency |
|--|------------------|
| Inspect and clean pre-screening devices and filters. | 3 months or less |
| Inspect and clean gutters and overflows. | 6 months or less |
| Inspect tank for sludge/sediment build up, inspect and clean gutters and clear surrounding vegetation and overhanging trees from roof areas. | Yearly or less |
| Inspect tank structural integrity and pipework by qualified professionals | 5 yearly or less |

7.6 Additional Information

- North Shore City Council Rain Tank Guidelines, First Edition, July 2008

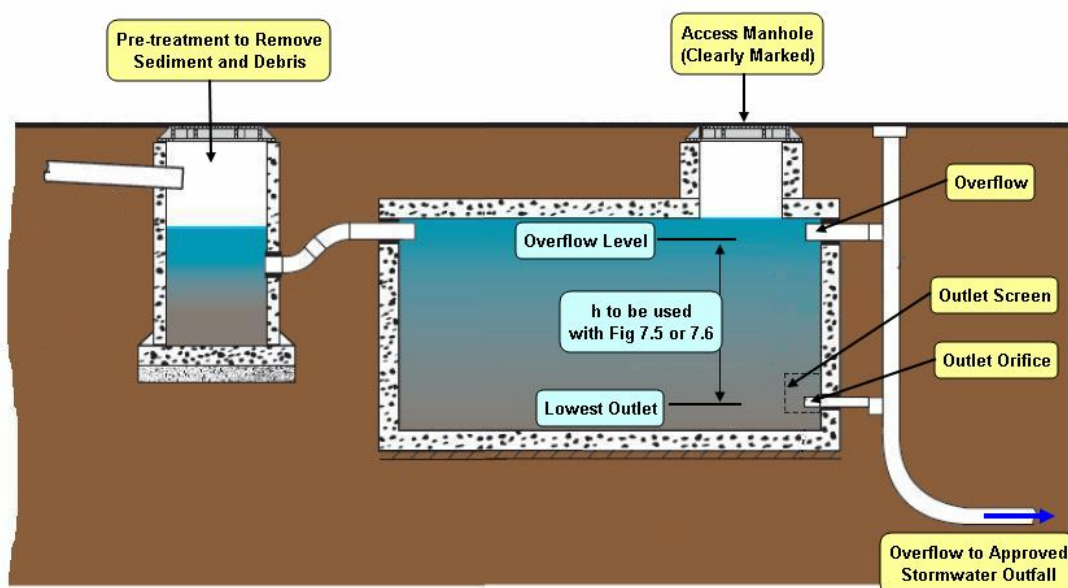


Figure 7.7: Below Ground Detention Tank Typical Components

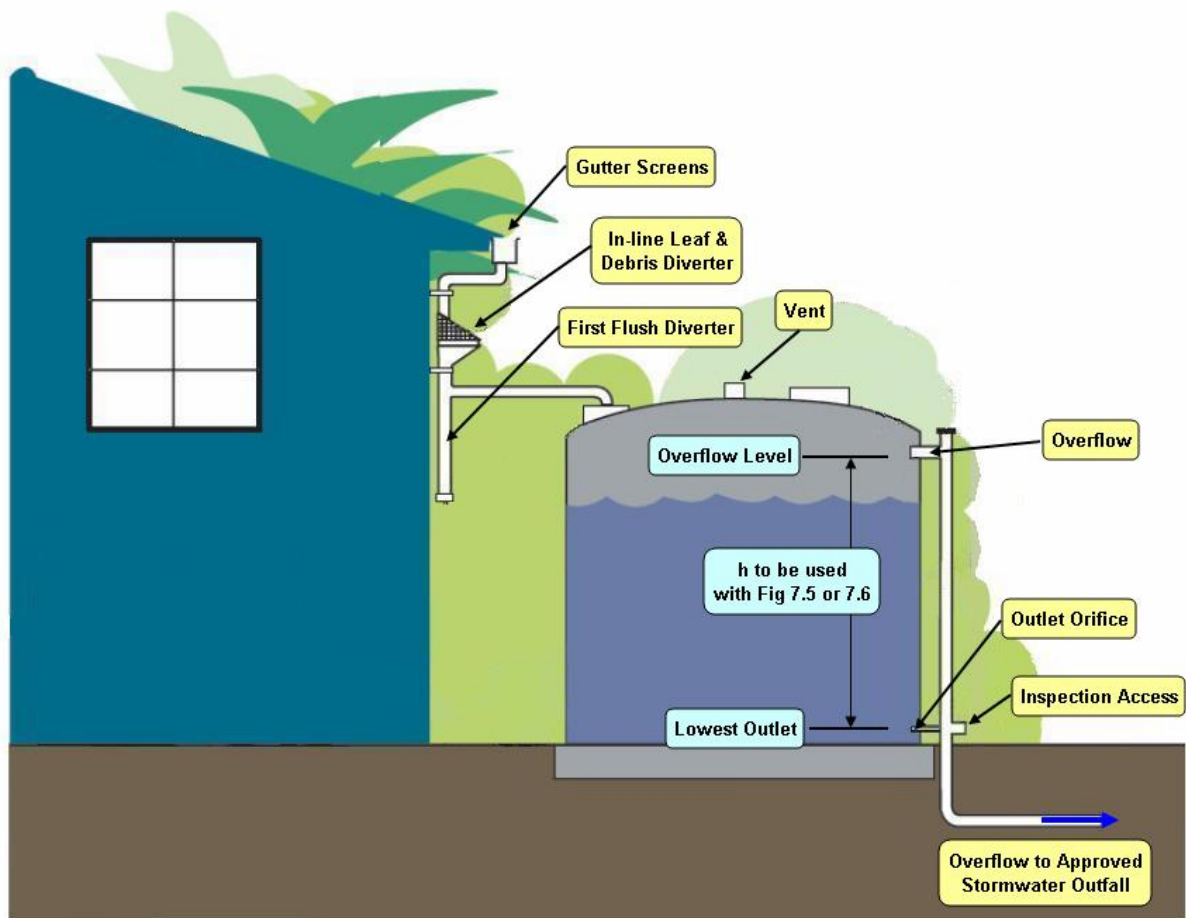


Figure 7.8: Above Ground Detention Tank Typical Components